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MONITORING SYSTEM FOR AUTOMATED TELLER  
MACHINE AND MONITORING APPARATUS  
FOR AUTOMATED TELLER MACHINE

BACKGROUND OF THE INVENTION

5           The present invention relates to a monitoring apparatus for an automated teller machine, a call center, and a monitoring system for the automated teller machine including the monitoring apparatus and the call center, and more particularly, to a technique  
10 for enabling response of positive information in real time in response to an inquiry from a user of the automated teller machine.

          The inquiry response of the monitoring system for the automated teller machine employs such a method  
15 that the automated teller machine and the monitoring apparatus are connected by an LAN link as cited, e.g., in JP-A-11-272924 or JP-A-8-16676 or by a public line as cited in JP-A-11-219466, so that an operator of the call center installed in the same area or in the same  
20 country as the monitoring apparatus responds to customer's inquiry on the basis of the information of the automated teller machine and customer's inquiry contents.

SUMMARY OF THE INVENTION

25           As shown in the above related art, the call

center in the monitoring system has a problem that the automated teller machine is operated on a 24-hour basis because the automated teller machines or the monitoring apparatuses are installed in the same area or in the same country as the automated teller machines or the monitoring apparatuses, which results in that the call center has also to be operated on a 24-hour basis to realize the smooth operation of the automated teller machines.

10               The above JP-A-2001-111696 also shows an example wherein the call center can respond to customer's inquiry on a 24-hour basis using an Internet telephone device. In the Publication example, however, the responding operator of the call center cannot  
15 suggest information necessary for solving the problem as in the automated teller machine. For this reason, even when the call center is operated on a 24-hour basis to accept inquiries, the call center cannot acquire machine information necessary for solving the  
20 inquiries.

              In view of the problems in the related art, it is an object of the present invention to provide a monitoring system or apparatus for an automated teller machine, a call center, and a monitoring system for the  
25 automated teller machine including the monitoring apparatus and the call center, which can respond to customers' inquiries in real time, even when the call center, e.g., in Japan is not in its operating time and

which can realize 24-hour support, by selecting one of other call centers installed in various areas of the world which is in its service or business hours in a time zone of the inquiry occurrence, by connecting the  
5 call center, and by interviewing with the customer over the inquiry while referring to machine information of the automated teller machine.

In accordance with the present invention, the above object is attained by providing a monitoring  
10 system which includes a call center for monitoring the states of automated teller machines and remote-controlling the automated teller machines and also includes a monitoring apparatus for controllably managing a network to sequentially monitor run  
15 information received from the automated teller machine, business information received from the call centers installed in various areas of the world, and operator information; and, when an inquiry takes place from a customer, which refers to information previously held  
20 in a storage of the monitoring apparatus, forwards the inquiry to a call center which is open or in service hours, and also transmits machine information and operation information received from the apparatus thereto.

25 More specifically, in accordance with an aspect of the present invention:

(1) The monitoring apparatus of the present invention includes a storage means for business

information including information about business hours received when the call center starts and closes its work and operator information about operator, choice means, when receiving an inquiry from a customer of the automated teller machine, for referring to the business information and operator information stored in the storage means and selecting one of call centers in its service hours, and a means for forwarding the inquiry to the call center selected by the choice means. The system also includes a means for receiving the run information of the automated teller machine and the operation information of the customer from the automated teller machine, transmitting the operation information and the operation information to the call center selected by the choice means when receiving an inquiry from the customer, and accepting fault information from the automated teller machine and storing it therein; and also includes a means for forwarding a fault declaration received from the customer of the automated teller machine to the call center selected by the choice means, examining the presence or absence of a fault announcement from the automated teller machine and in the case of the presence of the fault announcement, informing the fault information to the call center.

(2) In accordance with a further aspect of the present invention, the call center in the present invention includes a means for transmitting business

information including information on business hours  
when the call center starts or closes its work and  
operator information on operator to the monitoring  
apparatus, and a means, when accepting the run  
5 information of the automated teller machine, the  
operator information of the customer, and inquiry  
information of the customer from the monitoring  
apparatus, for referring to the run information and the  
operator information or referring to a question  
10 diagnosis or interview result with the customer, and  
transmitting a reply to the inquiry information to the  
automated teller machine. The system also includes a  
means for transmitting business information including  
information on business hours when the call center  
15 starts and closes its work and operator information on  
operator to the monitoring apparatus; and a means, when  
accepting fault information of the automated teller  
machine from the monitoring apparatus and a fault  
declaration from the customer, for referring to the  
20 fault information and an interview result to the  
customer and transmitting a reply to the fault  
declaration to the automated teller machine.

(3) In accordance with another aspect of the  
present invention, the monitoring system for the  
25 automated teller machine includes the monitoring  
apparatus mentioned in the above item (1) and the call  
center mentioned in the above item (2).

Other objects, features and advantages of the

invention will become apparent from the following description of the embodiments of the invention taken in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

5            Fig. 1 is a configuration of a monitoring system for an automated teller machine in accordance with an embodiment of the present invention;

            Fig. 2 is a functional block diagram of the monitoring system of the embodiment;

10           Fig. 3 is a first embodiment of the present invention, that is, an operational flow chart for explaining how to process an inquiry in a method for operating the monitoring system;

            Fig. 4 shows an example of an operator table  
15 113;

            Fig. 5 shows an example of a call center management table 112;

            Fig. 6 shows an example of a call center access table 111;

20           Fig. 7 shows an example of run information 116;

            Fig. 8 shows an example of operation information 114;

            Fig. 9 shows an example of inquiry  
25 information 115;

            Fig. 10 is an operational flow chart of a second embodiment of the present invention for

explaining how to process an inquiry in a method for recovering the monitoring system from a fault; and

Fig. 11 shows an example of fault information 117.

## 5 DESCRIPTION OF THE EMBODIMENTS

Embodiments of the present invention will be explained in detail with reference to the accompanying drawings.

Fig. 1 is a configuration of a monitoring  
10 system for an automated teller machine in accordance with an embodiment of the present invention.

In the drawing, reference numerals 1 and 2 denote automated teller machines having a function of processing various transactions; numerals 3, 4 and 27  
15 denote telephone devices for use in inquiry and question diagnosis or interview; 6, 20', 21', 22', 23' and 24' denote monitoring apparatuses installed in various areas of the world; 19 to 24 denote call centers connected to the monitoring apparatuses 20',  
20 21', 22', 23' and 24'; 5 denotes a network connected between the automated teller machines 1 and 2 and the monitoring apparatus 6; and 7 denotes a network connected between the monitoring apparatus 6 and the monitoring apparatuses 20', 21', 22', 23' and 24'.

25 The monitoring apparatus 6 can be connected to the call centers 20 to 24 via the network 7 and the monitoring apparatuses 20', 21', 22', 23' and 24'

installed in various areas of the world, or may be connected directly to the call center 19 by a private line.

Although only a monitoring apparatus and a  
5 call center are illustrated in each country for simplicity in Fig. 1, an arrangement similar to the illustrated network 5, automated teller machines 1 and 2 and automated teller machines 2 to 4 is, in fact, provided in each country. The respective automated  
10 teller machines, monitoring apparatuses and call centers have such internal structures as shown as enlarged in the drawing and operate similarly. The monitoring apparatus 6 in the drawing is shown as a representative of monitoring apparatuses installed in a  
15 country, and thus the monitoring apparatuses 20', 21', 22', 23' and 24' installed in various countries have a similar internal structure.

Each of the automated teller machines 1 and 2 has a display 12 for displaying a guidance to each  
20 customer to guide various transaction operations, a touch panel 13 for entering data according to the operational guide, a money input/output part 14 for processing paper money or bill and coins paid or deposited as input or output money, a card part 15 for  
25 reading or writing an inserted magnetic card, a bankbook part 16 for reading or writing a magnetic stripe region of the inserted bankbook and printing its transaction contents thereon, a storage 18 for storing



a program, input data and transmission/reception data, and a controller 17 for performing general control thereover.

Telephone sets (such as telephone devices 3, 4 and 27) for speech are installed to automated teller machines 1 and 2, the call centers 19 to 24 or in the vicinity thereof.

The monitoring apparatus 6 (similarly to the monitoring apparatuses 20', 21', 22', 23' and 24') has a communication part 9 for managing and controlling the networks 5 and 7 and forwarding customer's inquiry to a call center; a storage 11 for sequentially registering run information sent from the automated teller machines 1 and 2, operation instructions to the automated teller machines 1 and 2 sent from the call centers 19 to 24, business information of the call centers 19 to 24, operator information and so on; and a controller 10 for performing general control over the monitoring apparatus.

The call centers 19 to 24 are installed in the same areas or the like as the monitoring apparatuses 6 and 20' to 24' located in various areas of the world. Each of the call centers has a storage 28 for storing the run information of the inquired automated teller machines 1 and 2, operation information, fault information, and operator's input information of the call centers 19 to 24, a display 25 for displaying these information thereon, a touch panel

26 for entering an operation instruction to the automated teller machines 1 and 2 or machine information for inquiry, a telephone device 27 for use in inquiry from the user of the automated teller machines 1 and 2 or in questioning and diagnosing a fault declaration, and an operator 30. These display 25, touch panel 26, telephone device 27 and operator 30 are provided within the call center by a necessary number according to the necessary number of automated teller machines to be installed.

Fig. 2 is a functional block diagram of the monitoring system for the automated teller machine in accordance with the present invention, wherein parts having the same functions as those in Fig. 1 are denoted by the same reference numerals or symbols.

As shown in Fig. 2, the storage 11 of the monitoring apparatus 6 stores a call center access table 111 for storing call centers to be accessed in a priority order at intervals of a predetermined time, a call center management table 112 for storing the business states of the call centers, an operator table 113 for storing operator information including languages usable for the respective operators of the call centers, degrees of reception skill and knowledge levels for the operators, operation information 114, inquiry information 115, run information 116, and fault information 117.

(Embodiment 1)

In a first embodiment of the present invention, when the automated teller machine 1 installed in the territory of Japan (any country may be exemplified, but Japan is used as an example herein) is used at such midnight that the call center 23 in Japan already closes its service and the automated teller machine 1 installed in Japan is used, and when the user of the automated teller machine 1 got confused with how to operate the automated teller machine, user's inquiry can be accepted by an in-service call center installed in another country.

Fig. 3 shows a first embodiment of the present invention, that is, an operational flow chart for explaining how to process an inquiry in a method for operating the monitoring system for the automated teller machine.

The first embodiment of the present invention will be detailed by referring to the flow chart of Fig. 3.

When the operator of the call center 23 first enters own operator ID using the touch panel 26 within the call center at the time of starting his job (step S101), the controller 29 registers information indicative of the job start of the operator in the storage 28, and transmits the information to the monitoring apparatus 23' together with operator information about the operator previously registered in the storage 28 (step S102). As mentioned above, each

of the monitoring apparatus 20' to 24' have a structure similar to the monitoring apparatus 6 in the drawing. Thus, when the interior of the monitoring apparatus is referred to in the following explanation, it will be  
5 explained by using the same reference numerals as used for internal constituent components of the monitoring apparatus 6.

The monitoring apparatus 23' registers the operator information sent from the call center 23 in  
10 the operator table 113 of the storage 11 and also registers information indicative of the service start of the call center 23 in the call center management table 112 (step S103). Further, the monitoring apparatus transmits similar information (service  
15 start/operator information) to monitoring apparatuses located in various areas of the world.

Fig. 4 shows an example of the operator table 113 and Fig. 5 shows an example of the call center management table 112. As shown in Fig. 4, the operator  
20 table 113 contains operator information sent from the call center 23, that is, ID for each operator, language (for example, English (A), French (B), Chinese (C), German (D), Spanish (E), Japanese (F), and so on) usable by the operator, degree of reception skill  
25 (classified into ranks A, B,... depending on the degree of reception skill), device knowledge level (classified into ranks A, B,... depending on the knowledge level of the device), and operator's access frequency to prevent

concentration of access by a specific operator and to disperse access more effectively. The use language, reception skill degree and device knowledge level are set by an administrator on the basis of, for example, operator himself or the results of training lectures, tests and so on. The access frequency is assumed to be updated by each access of the associated operator. As shown in Fig. 5, further, the call center management table 112 contains service/non-service (the call center is in service or not) for each call center, operator information indicative of being busy or idle, location (country), and key telephone number.

Previously stored in the storage 11 is the call center access table 111 having accessing call centers registered in a priority order. That is, the call centers to be assumed to be open or in service (e.g., judging from jet lag or time difference or the like) are sequentially registered with respect to each inquiry time zone in the call center access table 111. Fig. 6 is an example of the call center access table 111.

When each automated teller machine is started in its transaction operation by a user (steps S104 and S105), the automated teller machine transmits the run information (indicating when and how the machine was operated) of the machine and operation information (when and how the user operated the machine) of the user at intervals of a constant time to the monitoring

apparatus 6 (step S106). The monitoring apparatus 6 in turn stores the received information as the run information 116 and operation information 114 in the storage 11 (step S107). Fig. 7 shows an example of the run information 116, which contains a machine number (the number of an automated teller machine), a date, time (when the machine was operated), and run contents (of the machine). Fig. 8 shows an example of the operation information 114, which contains a machine number, a date, time and run contents (of the automated teller machine). In this connection, the date and time for the run and operation information may be automatically attached and transmitted based on a clock provided in the automated teller machine.

15           The user conducts desired transacting operations according to the operational guidance appeared on the display 12 of the automated teller machine 1 (step S108), and, when the user gets confused with how to operate the machine on the way, the user  
20 makes a call over the monitoring apparatus 6 for operation inquiry using the telephone device 3 installed in the vicinity of the automated teller machine 1 (step S109). Upon the inquiry, the user enters inquiry information including desired language,  
25 inquiry type, installation location, date, time, inquiry contents from the push buttons of the telephone device according to the inquiry guidance bonded on the machine or appeared on the display 12. With regard to

a language to be used, the standard language of each country may be automatically attached as a default value on the basis of the area where the automated teller machine is installed, or the user may optically  
5 specify a desired language on the guidance display screen.

The monitoring apparatus 6, when detecting and accepting a user's inquiry (step S110), the apparatus informs the user of being accepted (step  
10 S111), and also stores the inquiry information 115 in the storage 11 (step S112). Fig. 9 is an example of the machine number, use language desired by the user, inquiry type, installation location, date, time and inquiry contents in the inquiry information 115. In  
15 this case, the word "inquiry type" as used herein refers to any of, e.g., operation-associated inquiry, fault-associated inquiry and business-/transaction-associated inquiry, or a general type of the inquiry transaction (such as money payment or withdrawal, money  
20 deposit or transfer).

The monitoring apparatus 6 selects one of call centers to be accessed on the basis of the call center access table 111 in the storage 11, and performs searching/selecting operations to see whether or not  
25 the selected call center is open or in service and its operator can answer to it using the call center management table 112 (step S113).

Further, the monitoring apparatus searches

the operator table 113 for the "use language" of the operator coinciding with the "use language" of the inquiry information 115 and the operator of the "machine knowledge level" and "reception skill degree" corresponding to the "inquiry type", "machine number" and "installation location" of the inquiry information 115, selects a desired operator, specifies the ID of the operator for the call center, and then forwards the user's inquiry to the call center.

10           When no conditions are provided for the operator selection, such a problem that inquiries tend to concentrate on a specific operator is considered. In the present embodiment, to avoid this, the selection of the desired operator is carried out, for example, as follows. The access frequencies  $n_i$  ( $i=1,2,3\dots$ ) of all operators are first initialized previously at zero. And when the monitoring apparatus receives an inquiry from a user, the apparatus selects one of the operators who can use a use language usable by the user and who  
20   has a high degree of reception skill and a high level of machine knowledge to cause the selected operator to access the user, and counts up the access frequency of the corresponding operator by one. Subsequently, even when an inquiry is issued from a user, the apparatus  
25   similarly counts up the access frequency of the selected operator. When the access frequency reaches a predetermined value, e.g., 3, the monitoring apparatus is operated to cause the operator not to be selected as



an operator for the subsequent inquiries. In this way, the apparatus is designed so that the apparatus accepts inquiries from users and, when all the operators make one round of rotation (that is, when the access  
5 frequencies of all the operators who can use the desired use language in the inquiry reach a predetermined value (e.g., 3)), the apparatus resets the access frequencies of all the operators at zero to enable acceptance of an inquiry from a user as in the  
10 first case.

As another selection method, the monitoring apparatus is designed so that the access frequencies  $n_i$  ( $i=1,2,3,\dots$ ) of all the operators are first initialized at zero and so that, when receiving an  
15 inquiry from a user, the apparatus selects one of the operators who can use a use language desired by the user and who has a high level of reception skill and a high level of machine knowledge to cause the selected operator to access the user for the inquiry, and counts  
20 up the access frequency of the selected operator by one. Subsequently, when the apparatus receives an inquiry from another user, the apparatus does not select the selected operator, selects another one of the operators having an access frequency of zero, and  
25 counts up the access frequency of the selected operator. For a next coming inquiry, the apparatus similarly selects one of the operators having an access frequency of zero and counts up the access frequency of

the selected operator. When the access frequencies of all the operators who can use the use language desired by the user reach 1, the apparatus selects one of the operators who has a high level of reception skill and a high level of machine knowledge to cause the selected operator to access the user for the inquiry, and counts up the access frequency of the selected operator by one. Subsequently, when receiving an inquiry from another user, the apparatus is designed not to select the previously-selected operator, to select one of the operators who has an access frequency of 1, and counts up the access frequency of the selected operator. When the access frequencies of all the operators reach a predetermined value (e.g., 3), the apparatus resets the access frequencies of all the operators at zero and gets ready for an inquiry from another user as in the first case. As a result, a specific operator can be prevented from being accessed concentratedly.

Further, the monitoring apparatus also transmits machine information (run information and operation information) received and stored in the storage 11 at intervals of a constant time after starting the transacting operation to the associated call center (step S114).

The operator of the call center inquires and analyses the installation location of the inquired automated teller machine 1, user's operational situations, etc. (step S115), and as necessary, refers

to the detailed information of the automated teller machine 1 from the machine information of the automated teller machine 1 received from the monitoring apparatus 6 (step S116).

5           The operator replies a suitable operational method on the basis of the question inquired result with the user and the detailed information of the automated teller machine 1 (step S117). The user, on the basis of operator's reply, continues his operations  
10 (step S118).  
(Embodiment 2)

A second embodiment will next be detailed in connection with a case where the automated teller machine 1 is used at such midnight that a call center  
15 located in the territory of Japan is not in service, a user gets a trouble such as an improper feed in his magnetic card inserted thereinto during his operation, and an in-service call center located in another country accepts a fault declaration from the user, by  
20 referring to the drawings.

Fig. 10 is an operational flow chart of the second embodiment of the present invention for explaining how to recover a fault in a monitoring system for an automated teller machine.

25           When the operator of the call center 23 first enters his operator ID on the touch panel 26 within the call center at its service start time (step S201), the controller 29 registers information indicating that the

operator started his work in the storage 28, and transmits the entered operator ID together with operator information relating to the operators previously registered in the storage 28 to the  
5 monitoring apparatus 6 (step S202).

The monitoring apparatus 6 registers the operator information sent from the call center 23 in the operator table 113 (refer to Fig. 4) of the storage 11, and also registers information indicative of the  
10 service start of the call center 23 in the call center management table 112 (refer to Fig. 5) (step S203). Further, the monitoring apparatus transmits similar information (service start/operator information) to respective monitoring apparatuses located in various  
15 areas of the world.

Also previously set in the storage 11 is a call center access table 111 (refer to Fig. 6) in which call centers to be accessed are previously set and registered in a priority order. That is, call centers  
20 assumed to be open or in service (e.g., judging from time difference and so on) are sequentially registered at in each time zone of an inquiry in the call center access table 111.

When a user gets a trouble during his use of  
25 the automated teller machine 1 (steps S204 to S208), the automated teller machine 1 transmits trouble information indicative of a fault occurrence to the monitoring apparatus 6 (step S209). The transmitted

information includes the machine number, use language desired by the user, fault occurrence date, operation history, fault occurred location and used medium.

The monitoring apparatus 6 saves the received  
5 fault information in the storage 11 (step S210).

Fig. 11 shows an example of the fault information 117, showing machine numbers, use languages, inquiry types, installation locations, dates, time, fault contents (operation history, fault  
10 occurred locations, used media) as an example.

Thereafter, when the user of the automated teller machine 1 informs the monitoring apparatus 6 of the fault using the telephone device 3 (step S211), as in the foregoing first embodiment, the monitoring  
15 apparatus 6 informs the user of the fault declaration being accepted (step S212), selects in-service call centers previously stored in the call center management table 112 of the storage 11, searches the operator table 113 based on the fault information 117 to selects  
20 an optimum operator (step S213), specifies the ID of the selected operator, and transmits the user's inquiry to the call center (step S214). For preventing a specific operator from being concentratedly accessed, a method similar to in the above first embodiment may be  
25 employed.

At the same time, the monitoring apparatus 6 judges whether or not a fault announcement is made from the automated teller machine 1 (step S215). In the

case of presence of the announcement, the monitoring apparatus informs the call center of the previously-received fault information and in the case of absence of the announcement, the monitoring apparatus informs  
5 the call center of no declaration (steps S216 and S217).

The operator of the call center determines a fault recovering method on the basis of the fault information of the automated teller machine 1 and the  
10 question-diagnosed result with the user (step S218).  
In the present example, since the fault comes from the improper feeding of the magnetic card, a card discharging instruction is issued from the call center to the automated teller machine 1 via the monitoring  
15 apparatus 6 (step S219) to eject the magnetic card from the automated teller machine (step S220). The user again tries to conduct the transacting operation using the ejected magnetic card (step S221).

As has been explained in the foregoing, in  
20 accordance with the present invention, the monitoring apparatus can select optimum one of call centers located in various areas of the world which is in service in response to an inquiry deep into night or early in the morning and can cope with the inquiry for  
25 connection thereof. As a result, even when a call center located in an area where the automated teller machine is installed is not in service hours, the monitoring apparatus can suitably reply the inquiry

from the user and cope with it in real time, thus enabling smooth 24-hour operation of the automated teller machine.

It should be further understood by those skilled in the art that although the foregoing description has been made on embodiments of the invention, the invention is not limited thereto and various changes and modifications may be made without departing from the spirit of the invention and the scope of the appended claims.